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10th August, 2012

Urban Land Development Authority
GPO Box 2202
Brisbane Qld 4001

ATTENTION MR FRANS VAN DEN BRINK
Email: Franz.Brink@ulda.qld.gov.au



Dear Sir

RE: PROPOSED RESIDENTIAL DEVELOPMENT SITE – OONOOMBA, TOWNSVILLE

1.0 INTRODUCTION

Morrison Geotechnic has been requested by ULDA to review the Geotechnical Engineering data from the site and to make particular comment on the need for site pretreatment using an impact roller. A site investigation and report was completed by AECOM relying on field and laboratory testing carried out by Douglas Partners.

Site levels at the test positions (CPT and Test Pits) indicate that the present land surface is generally at a height of RL 4.0 to 5.0m (AHD) with some lower parts or drainage channels in the range RL 2.0 to 3.0m (AHD). It is understood that the final subdivision level is about RL 4.2m requiring filling over the lower areas.

2.0 AECOM DATA

The AECOM report makes several observations and recommendations in relation to the residential use of the site

OBSERVATIONS

- Varying groundwater level
- Subsoils include loose sand in the top 2m but can be deeper (CPT38,39)
- Some soft clay close to the surface (CPT20,35 and Pit 12)
- Proposed general filling of about 1m increasing to 2m in the lower areas

PLANS AND DOCUMENTS
referred to in the PDA APPROVAL

18 JUL 2013

MEDQ



BEARING CAPACITY AND SETTLEMENT

- Site divided into Areas 1 and 2
- No quantitative data given on Bearing Capacity
- No quantitative data given on settlement

RECOMMENDATIONS

- Provide pre-treatment using an impact roller
- Further investigation to isolate the soft clay

3.0 MORRISON GEOTECHNIC REVIEW

3.1 THE SITE

From the data provided in the AECOM report, the site is generally underlain by competent and stable soils of low compressibility, the exception being three locations (CPT20,35 and Pit 12 where weak clay or silt was intersected. On the whole this is a stable site and suitable for its intended purpose as a residential subdivision. It is understood that Stage 1 has been completed.

3.2 SITE TREATMENT

Site treatment involves stripping and cut to fill earthworks and possibly the use of imported fill to raise the site to the general allotment design level of RL 4.2m (AHD). A strip depth of 150mm to 200mm should be allowed. Fill compaction should follow engineering guidelines to ensure that a Density Ratio of not less than 95% Standard has been achieved.

There is no need to use an Impact Roller since the sandy soils already have sufficient strength to carry the relatively light residential loadings. And further, the earthworks process would improve the density of any loose sand below. High groundwater levels in combination with very loose or loose sand pose a high risk of liquefaction during earthquake events but overall this risk is low because the likelihood of earthquakes is low.

3.3 SOFT CLAY TREATMENT

There is a need however to determine the extent of the soft clay as the filling loads and the loads from future housing would generate consolidation settlement. This can be done as future subdivision stages are considered.

- Firstly, after stripping use several passes of a heavy roller to determine the extent of soft shallow spots, and
- Secondly, have a management plan to treat the soft areas.

Soft clay treatment can be considered in three ways.

Option 1

Remove and replace where the soft clay is shallow. There is sufficient room on the site to spread and dry the soft clay for future use as fill.

Option 2

Leave in place and fill over with a minimum cover of 1.0m. Most of the primary consolidation settlement would be complete within 6 months leaving about 40mm of secondary consolidation to occur during the life of a residential dwelling. Residential footing and slab design would then follow the AS2870 deemed to comply approach.

Option 3

Preloading. The use of additional filling of 1.0m to 1.5m as preload could be considered to remove settlement concerns and to bring the lots in line with the general site classification of the developed subdivision allotments.

4.0 CONCLUSIONS

- 1) The specific ULDA question relating to the use of an Impact Roller has been answered above. Deep compaction is not considered to be necessary for this site.
- 2) For the treatment of the soft clay areas, the fill over only may be the preferred approach, unless it is shown in future work in the staged construction, that the impact on the housing costs was excessive leaving the way open for the alternative options. Preloading reduces future risks of excessive settlements in soft clay areas but construction timing may not allow this.
- 3) Site earthworks management should follow the AS3798 guidelines for Level 1. Supervision.

Should you require further information regarding the above, please do not hesitate to contact this office.

Yours faithfully



M.D. RILEY (RPEQ 5641)

For and on Behalf of

MORRISON GEOTECHNIC PTY LTD

